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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,518	01/02/2004	Naoki Abe	00280758AA	8684
30743	7590	12/12/2006	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C. 11491 SUNSET HILLS ROAD SUITE 340 RESTON, VA 20190			TIMBLIN, ROBERT M	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/749,518	ABE ET AL.
	Examiner Robert M. Timblin	Art Unit 2167

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 02 October 2006.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 23-48 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 23-48 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 06 October 2006 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
     1. Certified copies of the priority documents have been received.  
     2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
     3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date: _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)	5) <input type="checkbox"/> Notice of Informal Patent Application
Paper No(s)/Mail Date: _____	6) <input type="checkbox"/> Other: _____

### **DETAILED ACTION**

This office action corresponds to application 10/749,518 filed 1/2/2004.

Claims 23-48 have been examined and are pending prosecution. Response to arguments can be found on page 11 of this document.

#### *Response to Amendment*

The Examiner acknowledges the amendments. Claims 1-22 are cancelled and are replaced by new claims 23-48. These claims have been entered.

#### *Drawings*

With respect to the Applicant's amendments, the objections to the drawings are overcome. Accordingly, these objections are withdrawn.

#### *Claim Objections*

In light of the new claims, the previous claim objections have been withdrawn. However, the Examiner has objected to the following claims:

As per claim 23, the Examiner asks the Applicant to add a colon (:) at the end of line 16 and line 12 of claim 36.

As per claims 24-25, 37, and 38, the Examiner asks the Applicant to change "mis-characterizing" to "mis-classifying" as to become consistent with the specification.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Regarding claim 23, the phrase "substantially lower" renders the claim indefinite.

Appropriate correction is required.

Claims 30, 33, 37, 43, and 46 recite the limitation "said alarm criterion" in lines 5 or 6 of these claims. There is insufficient antecedent basis for this limitation in the claim. Furthermore, there is no support for alarm criterion in the specification.

Claim 28 recites the limitation "said machine-readable code" in line 1. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 23, 26, 28-31, 33, 34, 36, 39, 41-44, 46, and 47 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamanishi et al. ('Yamanishi' hereinafter).

With respect to claim 23, Yamanishi teaches a method of outlier detection comprising:  
generating a plurality of synthesized data (V data set; paragraphs 0064-0066), each representing a state (degree of outlier) within a given vector space (paragraphs 0061, 0064 and 0066-0068), said generating including a random number generation (paragraph 0066; therein the equation expresses a random number);

receiving a plurality of real sample data (data set x), each representing a detected real event as represented in said given vector space (paragraph 0061);

forming a candidate sample set (data set z; paragraph 0066) comprising a union of at least a part of said plurality of synthesized data (V data set) and said plurality of real sample data (X data set), said candidate sample set having a starting population (paragraph 0066), said candidate sample set being unsupervised as to which members will be classified by said method as being outliers as the labeling denoted in the z set (paragraph 0066);

generating a set of classifiers ( $t(i)$ ; paragraph 0066), each member of said set being a procedure or a representation for a function classifying an operand data as an outlier or a non-outlier as  $t(i)$  denotes a one-to-one function (paragraph 0066).

initializing said set of classifiers to be an empty set (latter part of 0066).

selectively sampling (sampling unit 23, paragraph 0087) said candidate sample data to form a learning data set (training data set W; paragraphs 0066-0069), said selectively sampling including

i) applying said set of classifiers (label indicating abnormality; paragraph 0087) to each of said candidate sample data and, if any classifiers are extant in said set, generating

a corresponding set of classification results (as generating new rules for characterizing data; paragraph 0088), and

ii) calculating a sampling probability value for each of said candidate sample data based, at least in part, on the corresponding set of classification results (as calculating a degree of outlier), and

iii) sampling from said candidate data to form said learning data set based, at least in part, on said sampling probability values (as sampling unit 23 samples each data based on the calculated degree of outlier; paragraph 0087),

such that said learning data set has a population (paragraph 0066) substantially lower than the starting population (filtering unit 21),

generating another classifier based on said learning data set,

updating said set of classifiers to include said another classifier,

and

repeating said selectively sampling, said generating another classifier, and said updating until said set of classifiers includes at least  $t$  members. The above three steps (i.e. generating another classifier... updating said set of classifiers... and repeating... is disclosed in Yamanishi wherein paragraph 0019, their system can be repeatedly executed); and

generating an outlier detection algorithm based, at least in part, on at least one of said another classifiers, for classifying a datum as being an outlier or a non-outlier as rules for determining outliers. These rules determine the unfairness (abnormal or not) of data (paragraph 0014 and figure 11 filtering unit 51).

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With respect to claim 26 and similar claims 31, 34, 39, 44, and 47, Yamanishi teaches calculating a sampling probability value includes identifying a consistency within said set of classification results and calculating a probability of said identified consistency using a Binomial probability function (paragraphs 0071-0077).

With respect to claim 28 and similar claim 41, Yamanishi teaches generating synthesized data generates said synthesized data in accordance with a given statistical likelihood of said generated data meeting an outlier criterion (paragraphs 0008 and 0066).

With respect to claim 29 and similar claim 42, Yamanishi teaches generating an outlier detection algorithm generates the outlier detection algorithm such that said algorithm applies an aggregate of members of said set of classification algorithms, calculates a corresponding set of detection result data representing each of said aggregate's member's classification, and applies a voting scheme to said corresponding set of detection result data as a set of rules (paragraphs 0017 and 0074 and figure 11).

With respect to claims 30, 33, 43, and 46, Yamanishi teaches calculating of said uncertainty value includes identifying a consistency among said set of classification results, and calculating a probability of said consistency, assuming each classification result within said set has a 50-50 probability of representing an operand as meeting said alarm criterion, statistically independent of said operand and of all other classification results within said set (paragraphs 0071-0075 and 0077; also threshold).

With respect to claim 36, Yamanishi teaches a system for classifying externally detected samples as one of at least normal and an outlier, comprising:

a machine controller having a readable storage medium (paragraph 0140);

a machine-readable program code, stored on the machine-readable storage medium (figures 1 and 3), having instructions to:

generate a plurality of synthesized data (V data set; paragraphs 0064-0066), each representing a state (degree of outlier) within a given vector space (paragraphs 0061, 0064 and 0066-0068), said generating including a random number generation;

receive a plurality of real sample data (data set x), each representing an observed event as represented in said given vector space (paragraph 0061);

form a candidate sample set (data set z; paragraph 0066) comprising a union of at least a part of said plurality of synthesized data and said plurality of real sample data (X data set), said candidate sample set having a starting population;

generating a set of classifiers ( $t(i)$ ; paragraph 0066), each member of said set being a procedure or a representation for a function classifying an operand data as an outlier or a non-outlier as  $t(i)$  denotes a one-to-one function (paragraph 0066).

initializing said set of classifiers to be an empty set (latter part of 0066).

selectively sampling said candidate sample data to form a learning data set (training data set W; paragraphs 0066-0069), said selectively sampling including

i) applying said set of classifiers to each of said candidate sample data and, if any classifiers are extant in said set, generating a corresponding set of classification results (as generating new rules for characterizing data; paragraph 0088), and

ii) calculating a sampling probability value for each of said candidate sample data based, at least in part, on the corresponding set of classification results (as calculating a degree of outlier), and

iii) sampling from said candidate data to form said learning data set based, at least in part, on said sampling probability values, such that said learning data set has a population substantially lower than the combined first and second population, generating another classifier based on said learning data set, updating said set of classifiers to include said another classifier, repeating said selectively sampling, said generating another classifier, and said updating until said set of classifiers includes at least  $t$  members (as sampling unit 23 samples each data based on the calculated degree of outlier; paragraph 0087); and

to generate an outlier detection algorithm based, at least in part, on at least one of said another classifiers, for classifying a datum as being an outlier or a non-outlier as rules for determining outliers. These rules determine the unfairness (abnormal or not) of data (paragraph 0014 and figure 11 filtering unit 51).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24, 25, 27, 32, 35, 37, 38, 40, 45, and 48, are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanishi as applied to claims 23, 26, 28-31, 33, 34, 36, 39, 41-44, 46, and 47 above in view of Meek et al. ('Meek' hereinafter) (U.S. Patent 6,728,690).

With respect to claim 24, Yamanishi fails to expressly disclose the limitation of receiving a given mis-characterizing cost data associated with at least one of said synthesized samples, representing a cost of said outlier detection algorithm mis-characterizing said at least one synthesized sample as a non-outlier.

Meek, however, teaches this limitation in column 11, line 65-col. 12, line 6. Therein Meek expresses concern to the cost of making a mistake in classification (i.e. mistaking real email for junk email) for providing excellent generalization performance (col. 12, lines 7-10).

Accordingly, it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because Meek's teachings would have given to Yamanishi's invention better indications of categories (i.e. positive or negative categories). Such categorizing is disclosed by Yamanishi as labeling (paragraph 0065, Yamanishi).

With respect to claim 25, Yamanishi fails to disclose constructing said learning data set from said candidate sample data is further based on said mis-characterizing cost.

Meek, however teaches this limitation in column 12, line 1-10).

With respect to claim 27 and similar claims 32, 35, 40, 45 and 48, Yamanishi fails to teach calculating a sampling probability value includes identifying a consistency within said set

of classification results and calculating a probability of said identified consistency using a Gaussian probability function.

Meek, however, teaches this limitation in column 2, lines 50-65 for a classifier function.

Accordingly, it would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine the teachings of the cited references because Meek's teachings would have given to Yamanishi's invention better indications of categories (i.e. positive or negative categories) and a classifier function (col. 2 lines 35-67). Such categorizing is disclosed by Yamanishi as labeling (paragraph 0065, Yamanishi).

With respect to claim 37, as these limitations are similar to those of claim 24, the same supporting rationale is used in the rejection of this claim. Accordingly the motivation for this rejection is the same as that of claim 24.

With respect to claim 38, Yamanishi fails to teach constructing said learning data set from said candidate sample data include instructions for constructing said learning data based, at least in part, on said mis-characterizing cost.

Meek, however teaches this limitation in column 13, lines 53-64).

***Response to Arguments***

Applicant's arguments with respect to claims 23-48 have been considered but are moot in view of the new ground(s) of rejection. The Examiner submits that claims 23-48 are taught accordingly by the references above.

The Examiner would also like to note that although the Applicant's remarks on pages 12-14 are directed towards cancelled claim 19, the Examiner believes the arguments are to be made to claim 23 and similar claim 36 and their depending claims. Accordingly, the Examiner has addressed these claims in the rejection above.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert M. Timblin whose telephone number is 571-272-5627. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Robert M. Timblin



Patent Examiner AU 2167  
12/1/2006



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